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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,284	06/29/2005	Ho Seob Kim	KIMH3005/REF	2017

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

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07/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,284	KIM ET AL.	
	Examiner	Art Unit	
	Phillip A. Johnston	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6-29-2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

Claims Rejection – 35 U.S.C. 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,288,401 to Chang, in view of Winkler, U.S. Patent No. 6,943,507.

3. Regarding claim 1, Chang teaches centering extraction electrode 310 (note Figure 8 below) fabricated on a silicon substrate that includes four electrode elements 310a, 310b, 310c, and 310d (a plurality of sensing regions), which are separated by (divided by) insulating layers. Col. 5, line 6-18; and line 62-67.

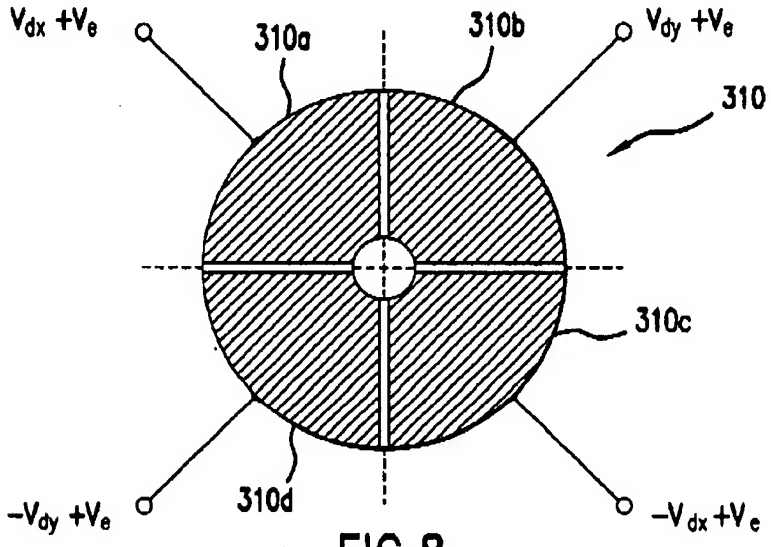

FIG.8

Chang also teaches that voltages ranging from a few tens of volts to a few hundred volts are applied to the extraction electrodes centering regions to correct for beam misalignment (note Figure 4 below). Col. 4, line 22-54.

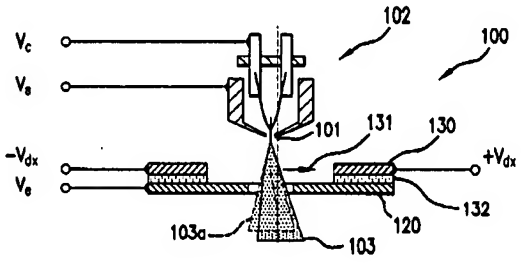

FIG.4

It is implied in Chang above that, in order to define the voltage range applied to the extraction electrodes centering regions to keep the beam centered, one would have detected the beam striking the centering regions, or encountered misaligned emitters that produced off axis beams that struck the centering regions. However Chang fails to teach the electron beam striking the centering (sensing) regions.

4. Winkler teaches an electron beam micro-column 2-1 (Note Figure 2a below) where an extractor electrode 2-4 is connected via conducting lines to current sensing unit 2-24 that measures the amount of beam current absorbed (striking) by the extraction electrode. See Col. 10, line 62-67; and Col. 11, line 1-7.

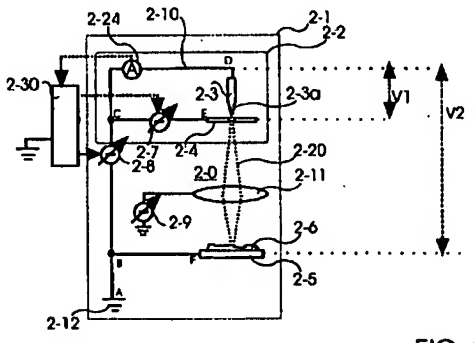

FIG. 2a

5. Winkler modifies Chang to provide sensing of the amount of beam current absorbed (striking) in the extractor electrode.

6. Therefore it would have been obvious to one of ordinary skill in the art that Chang would use the divided extraction electrode to sense a beam current striking the centering regions and deflect the beam back to ensure that the electron beam is aligned with the optical axis.

7. Regarding claims 2 and 3, Chang teaches that the centering electrode regions have a conductive layer, such as aluminum, gold, silicon (that is heavily n doped) or other conductive material deposited over the insulating layer. Col. 4, line 1-11.

It is also implied herein that, Chang's use of n-doped silicon technology to fabricate the centering (sensing) regions, would also include the use of p-n junctions.

8. Regarding claims 4 and 5, the rational applied above regarding claim 1, also applies to the structural limitations of claims 4 and 5, wherein Chang's teaching of centering the beam would include determining (verifying and calculating) which centering (sensing) region requires the proper bias amount to deflect the misaligned beam back on axis. Chang also teaches that prealignment of the emitter is mechanically performed, and when the electron emitter is properly prealigned with optical axis no centering potential is necessary, and uniform bias potential Vb is applied to all individual electrode elements so that a uniform extraction field is preserved. Col. 1, line 65-67; and Col. 4, line 34-40.

It is important to point out here that Chang teaches correcting misalignment between the electron emitter and the optical axis using both mechanical prealignment

and electrostatic beam centering, where electrostatic beam centering aligns the electron beam to the optical axis with the same or greater precision as with the conventional mechanical alignment.

In other words, Chang does not teach away from the claimed invention, but merely provides an optional or alternative means for centering the beam after conventional mechanical alignment of the emitter with the extractor, and only obviating the necessity of an extremely precise mechanical alignment, which is consistent with the applicants stated need for a method to easily and precisely align the electron emitter with the extractor hole.

9. Regarding claim 6, the rational applied above to claim 1, also applies to claim 6. In addition it is recognized herein that the limitation regarding; "sensing regions through which the electrons of the electron beam can be electrically transmitted" refers to the electrically conductive regions recited in claim 1.

10. Regarding claims 7 and 8, the rational applied above to claims 2 and 3, also applies to claims 7 and 8, wherein Winkler and Chang teach sensing regions that include conductive materials, and p-n junctions.

11. Regarding claim 9, the rational applied above regarding claim 1, also applies to the structural limitations of claim 9, wherein Winkler and Chang teach providing electron emitter at a first side of an object to be measured; providing an electron beam measuring device at a second side of the object to be measured, said electron beam measuring device including a plurality of sensing regions through which the electrons of the electron beam can be electrically transmitted, and insulating portions including

insulating material for prevention of the electron flow or low-doped semiconductor for reduction of the electron flow and dividing each of the sensing regions;sensing the electrons emitted from said electron emitter in each of the sensing regions; verifying position of the sensing regions being in a state of sensing the electrons in said electron beam measuring device and calculating the amount of the electrons striking each of the sensing regions; and calculating relative position of the first and the second sides on the basis of the measured data related to the position of each of the sensing regions being in a state of sensing the electrons and the striking amount of the electrons.

12. Regarding claim 10, the rational applied above regarding claims 1, 4 and 5, also applies to the structural limitations of claim 10, wherein Winkler and Chang teach, providing electron emitter at a first side of an object to be aligned; providing an electron beam measuring device at a second side of the .object to be aligned, said electron beam measuring device including a plurality of sensing regions through which the electrons of the electron beam can be electrically transmitted, and insulating portions including insulating material for prevention of the electron flow or low-doped semiconductor for reduction of the electron flow and dividing each of the sensing regions; sensing the electrons emitted from said electron emitter in each of the sensing regions;verifying position of the sensing regions being in a state of sensing the electrons in said electron beam measuring device and calculating the amount of the electrons striking each of the sensing regions; calculating relative position of the first and the second sides on the basis of the measured data related to the position of each

of the sensing regions being in a sensing state and the striking amount of the electrons ; and moving either one of the first or second side, or both the first and second sides on the basis of the verified relative position.

13. Regarding claim 11, the rational applied above regarding claim 10, also applies to the structural limitations of claim 11, wherein Chang also teaches deflecting the electron beam to be approximately parallel with the optical axis, e.g., within 3 milliradians, which implies calculating a beam parallelism (alignment) value in accordance with Chang. Col. 5, line 44-54.

14. Regarding claims 12 and 13, the rational applied above regarding claims 1,4, and 5, also applies to the structural limitations of claims 12 and 13, wherein Winkler and Chang teach verifying the position of the sensing region being in a state of currently sensing electrons and the amount of the current flow; calculating relative position between the extractor aperture and the electron emitter on the basis of the verified sensing region and the amount of the current flow; and moving said electron emitter, said extractor, or said electron emitter and said extractor according to said calculated data.

Conclusion

15. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim

can be reached at (571)272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

June 19, 2007

ROBERT KIM
SUPERVISORY PATENT EXAMINER